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ABSTRACT

Designed to aid decision makers at the Otselic Valley Central School (New York) in selecting the most cost-effective way of providing advanced courses to high school students, this study sought to identify the consequences of choosing a particular alternative so that better decisions could be made. This was done by comparing the cost and effectiveness of the course delivery system currently used to deliver instruction in college level calculus and English--i.e., audiographics (the Telelearning Project)--to a competing alternative--i.e., educational television (the TI-IN Network). Data were collected in a series of interviews with Otselic Valley students, teachers, administrators, and staff, and cost information was obtained from the district business office, Instructional Support Services at the Delaware-Chenango BOCES, and educational consultants associated with delivery system vendors. The audiographics system is a system linking students at multiple sites to an instructor using telephone lines, computers, speaker phones, and a fax machine, while the TI-IN Network is a commercial provider of educational television programs that are broadcast live and received by remote classrooms via satellite or cable. Analyses of the data indicate that, while audiographics has an apparent cost advantage over the delivery of courses via TI-IN, TI-IN has certain advantages in effectiveness over audiographics. Appended materials contain the calculations used to determine the costs to the Otselic Valley Central School District of up to four courses per year, per course, and per student for both audiographics courses and TI-IN courses via cable or via satellite. (DB)

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Increasing Student Access to Advanced Courses: Effectiveness, Cost, and Feasibility Analysis of Audiographics and TI-IN Network

Prepared For

The Otselic Valley Central School District

David E. Brigham

Syracuse University

December 1991

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I would like to thank the students, teachers, and administrators at Otselic Valley Central School who participated in this study. Special thanks to Mr. Pedrasa, Mr. Gary, and Mr. Foor-Pessin for taking time out of their busy schedules to meet with me. Each visit to the district deepened my appreciation of the commitment being made to provide Otselic Valley students with the best possible educational opportunities. Although I have tried to incorporate the concerns of participants into the fabric of this study, I acknowledge that the shortcomings of the final product are mine alone.

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I. Executive Summary

Introduction

This study was undertaken as a graduate course project during the fall semester of 1991 at Syracuse University in partial fulfillment of the requirements of IDE 841: Cost Effectiveness in Instruction and Training. It should be noted that this study was initiated by the author and not requested by the Otselic Valley School District. Nevertheless, school district personnel allowed the study to proceed and supplied the information necessary to carry it out.

Study Purpose

The purpose of this study is to aid decision makers at Otselic Valley Central School in selecting the most cost-effective way of providing advanced courses to high school students. This study seeks to identify the consequences of choosing a particular alternative so that better decisions can be made. This is done by comparing the cost and effectiveness of the present course delivery system, audiographics, to a competing alternative, instructional television.

Scope

Because of limited resources and time, this study focuses on providing academically capable students with access to advanced courses. Given more resources and time, the study could have been expanded to investigate ways of broaden the curriculum for other student populations.

Approach

The approach used in this study was guided by the general model for designing cost effectiveness studies developed by the instructors of IDE 841 at Syracuse University, suggestions offered by the instructors and classmates at several stages of the study, and ideas found in the literature on cost effectiveness. Decisions about the design and execution of the study were ultimately based on the author's judgement.

Data contained in this report were collected through a series of interviews with Otselic Valley students, teachers, administrators and staff. The interim principal, Mr. Pedraza, the guidance counselor, Mr. Gary, and a secondary English teacher, Mr. Foor-Pessin, were primary sources of information about the objectives, constraints, and operation of the current system of delivering advanced courses to students. Cost information was obtained from the district business office, Instructional Support Services at the Delaware-Chenango BOCES, and educational consultants associated with various delivery system vendors.

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II. The Problem: Access to Courses

In order to acknowledge the abilities of academically capable students to learn at a more rapid pace than their peers, the curriculum at OVCS allows qualified students to be accelerated in mathematics and English. By starting the standard four-year sequence in these subjects in eighth grade, students have room in their schedules as seniors to take additional courses that would enhance their ability to compete successfully in college. For this reason, the district has provided students access to college level calculus and English, and, when possible, access to advanced courses in other subject areas.

Barriers to Access. Several barriers make providing student access to advanced courses a challenge. The two main barriers are the district's size and location.

As a school district with a K-12 enrollment of 572 students (212 of which are in high school), OVCS cannot generate the numbers of students or the amount of tax revenue required to justify hiring additional teachers solely to teach advanced courses. Moreover, the size of the faculty is barely adequate to teach the curriculum required by the State of New York much less additional courses. Lastly, a small faculty tends to result in a shortage of teachers qualified and willing to teach advanced courses.

The remote geographic location of OVCS also makes providing student access to courses difficult. Severe winter driving conditions and substantial distances to neighboring schools (not to mention scheduling problems) mitigate against busing students to other schools or to colleges for instructional purposes. These conditions would also serve as barriers to hiring itinerant teachers. Consequently, because of the barriers of location and size, the district has sought to provide student access to advanced courses by other less conventional means.

Current Access. Since 1985 when the Delaware-Chenago BOCES began to make advanced courses available to component districts through the Telelearning Project, OVCS has been able to provide students with access to a limited number of advanced courses. The Telelearning Project uses audiographics (described later) to deliver advanced courses to participating school districts. This year three OVCS students are enrolled in college level Calculus and nine in English. These are the only advanced courses to which OVCS students have access.

Future Access. High school guidance counselor, Mr. Gary, anticipates an increased demand for advance courses next year. More students are expected to enroll in both calculus and English and from 5 - 8

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students will be eligible for an advanced Spanish course. In addition, students have expressed an interest in taking psychology and French courses.

Assuming calculus and English will be the only courses available through the BOCES Telelearning Project, OVCS would have to find an alternative way to provide student access to courses such as Spanish, psychology, or French. Thus, for the 1992-93 school year, a gap is anticipated between the level of access students would like to have to courses and the level of access they will have.

III. Criteria For Selecting Alternatives

In order to select alternatives for increasing student access to advanced courses, a set of criteria must be specified so that appropriate alternatives can be identified. Once this has been done, potential alternatives can be identified and the most promising selected for further study.

A useful technique for developing a set of selection criteria is to identify the features an ideal course delivery system must have in order to operate successfully in a given setting. These features can then be used as criteria to evaluate alternatives. If, for example, an ideal system were installed at OVCS, it should have the following features:

Wide Course Selection. The system should provide all the courses the school district wants to make available to students.

Excellent Course Quality. All courses should satisfy the New York State Education Department's standards, and when appropriate, lead to college credit.

High Student Satisfaction. Students should be satisfied with every aspect of the courses including the way content is presented, learning activities, the level of interactivity, and the evaluation of student work.

High Teacher Receptivity. Teachers should support the delivery system chosen. Teachers should view the delivery of courses as supplementing the curriculum and not as a threat to teachers' jobs.

Easy Implementation and Maintenance. The system should be simple to put into operation and keep running smoothly. Problems with scheduling, equipment, and recording should be rare.

Minimal Staffing Requirements. No extra staff should be necessary and little, if any, extra time or effort should be required of present staff.

High Flexibility. The delivery system should be able to be used for purposes beyond providing courses for students. For

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example, the system might be used for teacher or administrator training, adult education, and community oriented projects.

Cost Effectiveness. The system should be affordable and provide the optimal level of effectiveness for funds expended. Any increase over present costs should fall within budget constraints and be offset by increases in effects or benefits.

While a given delivery system will not have all the performance features of an ideal system, some will have more than others. The objective is to select course delivery systems based on the degree to which they exhibit these features.

IV. Two Alternatives

In theory, courses could be delivered to students in several ways ranging from traditional classroom teaching to satellite teleconferencing. However, given the selection criteria and constraints at OVCS, the number of feasible alternatives quickly diminishes.

In fact, only two alternative delivery systems were selected for comparison in this study:

1. audiographics available through BOCES' Telelearning Project, and
2. interactive instructional television available from TI-IN Network.

Audiographics was selected as an alternative since it is currently in use at OVCS and is likely to remain an option for the near future. TI-IN Network was chosen as an alternative because several school districts in Central New York State are considering instructional cable television as a means of delivering courses and TI-IN Network seems to possess many of the features of the ideal system (described above). A brief description of each alternative is provided below. (More detailed information is available from the author upon request.)

Alternative 1: Audiographics. This system links students at multiple sites to an instructor by using standard telephone lines. Each site is equipped with a computer, speaker phones, color monitor, graphics tablet, and fax machine.

Otselic Valley Central, Hancock Central, and Windham Central are currently linked via audiographics equipment so that students at all sites can take a college level English course taught by Mr. Foor-Pessin from his classroom at Otselic Valley. Nine OVCS students are in Mr. Foor-Pessin's classroom as he teaches the course simultaneously to all three sites.

A typical class lesson involves Mr. Foor-Pessin orally introducing a discussion topic by referring to graphics or text he has prepared in advance. Students at all sites simultaneously hear Mr. Foor-Pessin speak

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on their speaker phones and view the graphics on their computer monitor that Mr. Foor-Pessin has created for them.

Class discussion occurs over the speaker phones similar to the way in which it does during conventional telephone conference calls. All participants are able to hear and speak with each other. The light pen and graphics tablet also permit students to communicate by writing or drawing.

While OVCS serves as a sending site for the English course, it is a receiving site for the calculus course. Calculus originates from the instructor's home in Hamilton and is received only by OVCS students. No other courses are presently available on the audiographics system.

Alternative 2: TI-IN Network. Ti-In Network (TI-IN) is a commercial provider of educational television programs. TI-IN courses are broadcast live from television studios in San Antonio, Texas for viewing by 6000 students in 1000 school districts and 39 states.

Schools receive TI-IN broadcasts via satellite or cable. Each classroom is equipped with a television monitor, video cassette recorder (VCR), a Subscriber Interface Device (SID), and a printer.

A typical TI-IN lesson lasts 50-minutes and starts with the classroom facilitator tuning into the proper channel and ensuring students are ready to learn. The TI-IN teacher introduces and presents the lesson using audio-visual aids as appropriate to the content. The teacher asks students questions and students respond by speaking into the SID (a device resembling a telephone). Students also use the SID to ask the teacher questions or to talk with students at other sites.

Before the lesson ends, students will have been given a homework assignment to work on for the next class. The facilitator manages the collection and return of homework and administers quizzes and exams provided by TI-IN.

Outside of class time, students may receive extra help by using a toll free number to call their TI-IN teacher or a course tutor. Depending on when the call is made student inquiries may be answered immediately or responded to later.

V. Rating Alternatives

Before the two alternative delivery systems can be compared, they must be rated on specific criteria. Three categories of criteria have been derived from the features of the ideal delivery described earlier: cost, effectiveness, and feasibility. Specific criteria included under each category are listed below:

Costs

- Research & Development

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- Investment
- Operation
- Unit Costs

Effectiveness

- Course Selection.
- Course Quality
- Student Satisfaction.

Feasibility

- Teacher Satisfaction
- Implementation/ Maintenance
- Staffing Requirements
- Flexibility

Each alternative will be rated on these criteria in this section of the report. The two alternatives will be compared in the next section.

A. Costs

A comprehensive analysis of all costs connected with the two alternatives is not necessary for this study. Thus, only costs relevant to the district decision makers are analyzed and displayed.

In order to more accurately portray the cost of each alternative, costs are specified according to the development phase in which they occur: research and development, investment, and operation. Estimated average annual operation costs and total costs are calculated to reflect the cost of delivering two courses with an enrollment of five students each for five years. This level of service was chosen based on recent enrollment trends in offerings at OVCS.

Unit costs (cost per course and per student) are shown at selected levels of service to illustrate how costs vary according to the number of courses delivered and student enrollment. Because fee structures of the two alternatives are quite different, the portrayal of unit costs are intended to show the general effects of the number of courses delivered and the level of student enrollment and cannot address all possible levels of service. However, information contained in the appendix can be used to calculate specific costs for any specific number of desired courses or students.

It should be noted that certain costs are being treated as equivalent and are not displayed. For example, since both alternatives require the same facilities (one classroom per course), one facilitator per course, a dedicated phone line, and similar textbooks and materials, these costs are viewed as cancelling each other out since differences between them seems to be negligible. Thus, costs reported in this study are not comprehensive.

The Costs of Alternative 1: Audiographics.

While substantial costs were encountered in the research and development and investment phases of the Telelearning

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Project in the early years of the project, these costs are no longer incurred. Thus, resources spent on hardware, software, teacher training, and the development of materials are not listed. However, operating costs incurred by the district are represented.

The following table shows the estimated average annual operating costs to the district of two audiographics courses. Table 1 has been created by using 1991-92 costs to predict future costs (adding 5% per year for inflation).

Table 1: Estimated Costs of Two Audiographics Courses

R&D	NA
Investment	NA
Operations Per Year	$2,538*
Operations Five Years	$12,690
Total Costs	$12,690

* See Appendix A for detailed cost information.

Operation costs shown in Table 1 include course delivery fees charged by BOCES to school districts. In 1991-92 these fees consisted of the following:

- $2,500 annual subscription fee and
- $2,500 for each course delivered

Thus, the dollar amount BOCES charges totals $5,000 for one course, $7,500 for two courses, etc. There are no additional charges based on enrollment. (Between 2-8 students are recommended per class.)

However, $7,50 does not represent the real cost to the district. BOCES refunds a portion of fees it receives depending on a district's state aid ratio. In OVCS's case, 74% of BOCES fees are returned to the district.. The effect of this refund has been incorporated into the calculation of all costs displayed for audiographics. (Projected costs are also based on a 74% state aid ratio since the district's aid ratio has remained fairly constant for the past few years.)

Costs per audiographics course and cost per student vary with the number courses received from BOCES. Table 2 below shows how unit costs change according to the number of courses received. (Five students are assumed to be enrolled in each course.)

Table 2: Estimated Unit Costs of Audiographics Courses

Courses Received	Per Course	No. of Students	Per Student
1	$1,692	5	$338
2	$1,269	10	$254
3	$1,128	15	$226
4	$1,007	20	$201

* See Appendix A for detailed cost information.

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Table 2 illustrates as the number of courses received increases cost per course and student decreases. The sharpest drop in unit costs occurs as a second course is added causing unit costs to decrease by nearly 25% (from $1,692 to $1,269 per course and from $338 to $254 per student). However, adding a third or fourth decreases unit costs by only about 11%.

A final comment must be made regarding the cost of audiographic courses. If students want to receive college credit for a course, they must pay tuition to the State University College at Morrisville. For 1991-92 tuition at Morrisville is about $275 for one semester (3 credit hours) or $550 per year (6 credit hours). Most students pay the optional fee.

The Costs of Alternative 2: TI-IN Cable Courses.

Research and development costs are not encountered by new subscribers to the TI-IN Network. But a one-time investment for hardware is required. The total, one-time investment for TI-IN's subscriber interface device, television, television cart, and VCR is estimated at $2,100.

Operation costs for TI-IN include the following fees:

- $3,500 annual subscribers fee (1991-92 rate)
- $530 tuition per student (1991-92 average fee)

The school district may elect to pay tuition fees for students, or require students to pay.

Table 3 shows the estimated investment cost and the average annual operating costs to the district for subscribing to two TI-IN cable courses each with a student enrollment of five students.

Table 3: Estimated Investment and Operation Costs of Two TI-IN Courses

Phases	Student Pays Tuition	District Pays Tuition
R&D	N A	NA
Investment	$ 2,100	$ 2, 100
Operations Per Year	$ 4,061	$10, 211
Operations Five Years	$20,307	$51,057
Total Costs	$22,407	$53,157

Table 3 reveals the large differences in cost to the district if it were to assume tuition payments for students. In this case, operations costs to the district would more than double.

Table 4 below shows how unit costs are affected by the number of courses (mainly because of enrollment) delivered and by whether the students or district pays tuition. (Investment costs are included in estimated annual costs and the enrollment per course is assumed to be five students.)

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Table 4: Estimated Unit Costs of TI-IN Courses Based on Who Pays Tuition*

	Student Pays		District Pays	
Courses	Per Course	Per Student	Per Course	Per Student
1	$4,481	$896	$7,556	$1,511
2	$2,241	$448	$5,316	$1,063
3	$1,493	$298	$4,569	$ 914
4	$1,121	$224	$4,195	$ 839

* See Appendix B for detailed cost information.

Table 4 shows how spreading costs over additional courses lowers unit costs on a per course and per student basis. For example, when students pay tuition and a second course is added to the first, the unit cost drops by about 50%, the third course decreases units costs by about 33%, and the fourth by 24%. While lower costs are also realized when the district pays tuition, the resulting unit costs are cost prohibitive. Consequently, costs encountered when the district pays tuition will no longer be shown in this report.

When the students pay tuition, the district pays the same subscription fee no matter how many courses students are delivered. Only the average operation charge of $4,061 shown in Table 3, would be paid by the district regardless of the number of courses for which students registered.

Since schools may elect to receive TI-IN courses by cable or directly via satellite, a table has been prepared to show the costs of course delivery by cable and satellite. Costs for satellite delivery include an extra investment cost of an estimated $4,000 required for purchasing a satellite dish. Again costs have been calculated assuming a student enrollment of five per course and that students will pay tuition.

Table 5: Estimated Unit Costs of TI-IN Courses: Cable vs. Satellite Delivery*

Tuition:	Cable Delivery		Satellite Delivery	
Courses[a]	Per Course	Per Student	Per Course	Per Student
1	$4,481	$896	$5,281	$1,056
2	$2,241	$448	$2,641	$ 528
3	$1,493	$298	$1,760	$ 352
4	$1,121	$224	$1,320	$ 264

* See Appendix B for detailed cost information.
a Five students are assumed to be enrolled in each course

Table 5 shows that as the number of courses (and enrollment) increases the cost differences between cable reception and satellite reception decreases per course and per student. For example, for one course the difference is $800 per course and $161 per student whereas these differences diminish to $199 and $40 for four courses (20 students). Thus, on a unit cost basis, the two delivery modes become quite close in cost as the number of courses increase.

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Overall, the cost information provided in the four tables shows that the costs of TI-IN are substantially more than those of audiographics. However, the effectiveness and feasibility of each alternative must be considered before any conclusions can be drawn about the cost-effectiveness of either alternative.

B. Effectiveness

The next criterion to be considered is effectiveness. Specific criteria used to judge the effectiveness of each alternative are course offerings, course quality, and student satisfaction.

Audiographics Course Offerings. Since the main objective of the Telelearning Project is to provide student access to a broader curriculum, the number and range of courses a delivery system makes available to students is an important criterion for determining effectiveness. Two courses, calculus and English, are currently available to students via audiographics. According to the director of BOCES Instructional Support Services, these courses will be offered again next year.

But Otselic Valley students are also interested in access to additional courses such as Spanish, French, and psychology. While the audiographics system has been used to deliver up to five courses (during 1987-88) calculus and English have been the only courses offered for the past four years. In fact, only English was offered during 1989-90. Consequently, because the trend has been to offer two staples, calculus and English, access is rated as limited.

Audiographics Course Quality. Audiographics courses are taught by certified New York State teachers and meet all state requirements. Thus, a full year audiographic course is worth one unit of credit toward a high school diploma. In addition, since 1989 students paying tuition can receive college credit from the State University College at Morrisville after successfully completing a course. Therefore audiographics course quality is rated as excellent.

Audiographics Student Satisfaction. Otselic Valley students enrolled in calculus and English have reported that a week or two is required to adjust to the audiographics environment. Once adjusted, however, students say they enjoy the courses. Dissatisfaction with the courses comes from infrequent problems with equipment such as poor audibility and the inability of audiographics to allow students and teachers to see each other. Thus, student satisfaction with the audiographic courses is rated as moderately high.

TI-IN Network: Course Offerings. Subscribing to TI-IN via cable provides

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access to eleven courses. Offerings for the 1991-92 school year include year long courses in anatomy & physiology, art history, calculus, German (I & II), Japanese (I & II), Elementary Spanish, and physics. In addition, half year courses are offered in marine science and astronomy. Enrichment programs are broadcast for 25 minutes each Friday on special topics such as foreign cultures and outer space. Thus, access to courses via cable is rated as very good.

Receiving TI-IN via satellite dish would permit access to all the offerings delivered by cable plus an additional eleven courses including full year courses in French (I & II), Latin (I & II), Spanish (I & II), psychology, and AP English literature. Half year courses are offered in elementary analysis, trigonometry, psychology, and sociology. Access to courses for this option is rated as excellent.

TI-IN Network: Course Quality. The course quality of TI-IN courses is yet to be determined and is a potential problem area. Two key questions must be answered. One is which courses are eligible for New York State high school credit? The other is how well do TI-IN courses prepare students to take the Advanced Placement exams? Answers to these questions will be reported when they have been obtained. Until then, the quality of TI-IN courses must be rated as unknown.

TI-IN Network:Student Satisfaction. Research on instructional television has generally shown students are satisfied with interactive cable courses. In the case of TI-IN, however, student satisfaction may depend largely on the level of interactivity with the instructor. Large nationwide enrollments reduce the amount of interaction any one class or student can have with the instructor or other students.

On the other hand, students will have a toll free number they can call from home for tutoring assistance or to have specific questions answered. In addition, TI-IN courses can be videotaped for multiple viewings. Student satisfaction with the TI-IN courses is therefore rated moderately high.

C. Feasibility

The last category of criteria is feasibility. Each alternative will be examined for its ability to satisfy the following specific criteria: implementation and maintenance, staffing requirements, teacher receptivity, and flexibility.

Audiographics: Implementation and Maintenance. On a daily basis, the audiographics system works smoothly. Technical problems occur infrequently and are usually quickly corrected. However,

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scheduling students for audiographic courses causes problems for the guidance counselor who must build the school's master schedule around the times BOCES offers audiographics courses. Overall, implementation and maintenance is rate as satisfactory.

Audiographics: Staffing Requirements. Minimal demands are made on OVCS staff because of audiographics course delivery. In the case of audiographics English, Mr. Foor-Pessin, the instructor, teaches OVCS students as he teaches students at other sites. However, because the English course is scheduled for first period, he must be relieved from homeroom duties in order to ensure the system is operational when his students enter the classroom. Another teacher covers his homeroom duty.

Supervision requirements for the students taking calculus are also minimal. A teacher is assigned to the room much as he would be normally be assigned to a study hall. Since he does not participate in the course, this duty is considered supervisory. Thus, staffing requirements for audiographic courses is rated minimal.

Audiographics: Teacher Receptivity. Teacher support for the Telelearning Project has ranged from negative to cautious skepticism. Some teachers are concerned that the program may threaten teachers' positions if not now, then in the future. Moreover, there is concern about whether audiographic teachers should be paid by BOCES and by the district . Thus, teacher receptivity is low to indifferent.

Audiographics: Flexibility. Audiographics can be used for many purposes. It is flexible in that it can deliver graduate courses to teachers, inservice training courses, or courses for community groups. It has also been used to take electronic field trips during which students interview famous people. A problem with using audiographics for other purposes is that substantial training and design work is required to design quality courses. Thus, on flexibility, audiographics is rated very good.

TI-IN Network: Feasibility. Since the district has not subscribed to TI-IN, determining the feasibility of this alternative is somewhat speculative. Nevertheless, published information about TI-IN, access to a TI-IN educational consultant, and a basic knowledge of the Otselic Valley context was used to address feasibility.

TI-IN Network: Implementation and Maintenance. Once students have been registered and the equipment installed, the technological elements system should be implemented and maintained with few problems. Transmission of television programming by cable or satellite is reliable

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and video transmission problems are expected to be rare. However, the level of reliability and ease of using the SID device (telephone) for students to interact with the instructor remains to be determined by the author.

But implementation problems are anticipated for scheduling students. TI-IN courses are broadcast live starting on the hour from 8:00 AM to 4:00 AM daily with 50 minute classes . On the other hand, OVCS classes start at 8:18 AM and last 43 minutes. Depending on the number of OVCS students enrolled in courses the on-the-hour starting times and the longer periods could create serious problems for scheduling students and facilitators.

Further implementation difficulties may occur because TI-IN's 3:00 and 4:00 classes fall outside OVCS's normal instructional day. If students were to register for late afternoon TI-IN classes, providing facilitators and transportation home for the students may be a problem. Unless these scheduling problems can be solved, students may find their access to TI-IN courses is limited to those courses most conveniently scheduled. Thus, implementation and maintenance is rated as somewhat unsatisfactory.

TI-IN Network: Staffing Requirements. Except possibly for the 3:00 and 4:00 classes, TI-IN courses should not require additional staffing for supervision. The existing supervisory system should suffice. However, facilitators supervising TI-IN classes are expected to take class attendance, grade homework, collect and distribute materials, and proctor examinations.

Facilitators of TI-IN courses except science courses do not have to be teachers. Certified teachers (any subject) are required for science courses to ensure laboratory exercises are conducted safely. Thus, facilitator assignments are usually treated as supervisory assignments, not teaching assignments. But to the extent teachers feel facilitator assignments qualify as teaching assignments, problems may arise. Thus, staffing requirements for TI-IN courses are rated as minimal but with increased responsibilities.

TI-IN Network:Teacher Receptivity. TI-IN may not be welcomed by teachers. One reason is teachers facilitating TI-IN courses may resent the increased responsibilities. Another is that they may resent the disruption of their classroom routine and planning if students are allowed to arrive late from TI-IN classes or leave early to go to TI-IN classes. A third reason teachers may not welcome TI-IN courses is they may feel jobs could be lost because of TI-IN. However, this negative attitude may be softened if teachers find the inservice

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courses and other courses useful. In spite of benefits teachers may see for students (or themselves), teachers receptivity of TI-IN is likely to be low.

TI-IN Network: Flexibility. In addition to direct classroom instruction, TI-IN offers live, interactive staff development courses for teachers and administrators, free facilitator training, special test reviews (SAT Prep.), CNN Newsroom (a 15 minute daily news program), and special student enrichment programs. TI-IN subscribers with satellite dishes can earn college credits, graduate and under graduate degrees through evening courses offered through Mind Extension University. In terms of flexibility, TI-IN is rated excellent.

VI. Comparing Alternatives

Now that both course delivery systems have been rated individually on a specified set of criteria, they can be compared. To facilitate this comparison, I have displayed the ratings given to each alternative next to the corresponding criteria by forming a matrix. Table 6 represents a convenient summary of information intended to help decision makers determine which delivery system is more cost effective.

Table 6 indicates that in terms of effectiveness, TI-IN is clearly superior in delivering in the number of courses it makes available to students (11 via cable or 22 via satellite versus 2 or 3 for audiographics). However, the excellent quality of audiographics courses gives it an advantage over the undetermined quality of TI-IN courses. Student satisfaction for both courses is likely to be moderately high.

On the first three feasibility criteria, implementation & maintenance, staffing requirements, and teacher receptivity, audiographics has the edge. It is likely to be a bit easier to implement, demand less from the staff, and be received less negatively. On the other hand, TI-IN has the edge in flexibility since it provides ready access to a variety of programs suitable for a wide range of populations. While audiographics has the potential for similar uses, time and resources would have to be spent to create quality programs.

In terms of costs, audiographics course delivery has an advantage over TI-IN Network courses. Using TI-IN which requires investment expenses ($2,100 for cable or $6100 for satellite) upfront, and operating expenses which are over 60% higher for operation per year, operation for five years, and total dollar costs. Unit costs for TI-IN are over 75% higher than the costs for audiographics delivery at this level of service.

A final observation regarding the costs displayed on Table 6 is the cost of satellite delivery of courses is only about 18% more

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TABLE 6: EFFECTIVENESS-FEASIBILITY-COST MATRIX

CRITERIA	AUDIOGRAPHICS	TI-IN NETWORK	
Effectiveness			
• Course Offerings	**Limited:** Currently provides only two courses. Sometimes provides three.	**Very good-Excellent:** 11 courses via cable. 22 courses via satellite	
• Course Quality	**Excellent:** Meets NYS standards College Credit via Morrisville	**Undetermined:** Requires further investigation.	
• Student Satisfaction	**Moderately High:** Must adjust to medium Occasional tech. problems Prefer visual contact.	**Moderately High:** Visual contact with instructor. Occasional tech. problems Interactivity opportunities fewer.	
Feasibility			
• Implementation & Maintenance	**Satisfactory:** Smooth daily operation but some scheduling problems for guidance.	**Unsatisfactory:** Smooth daily operation. Substantial scheduling problems.	
• Staffing Requirements	**Minimal:** Uses existing staff in traditional ways.Teacher must cover English teacher's homeroom (AM).	**Minimal With Increased Responsibilities:** Higher level of participation required of supervisory staff.	
• Teacher Receptivity	**Low-Indifferent:** Many teachers feel jobs may be threatened. Afraid of equipment. Most never observed a class.	**Low:** Fear jobs are or may be threatened. Resent disruptions caused by scheduling/facilitating.	
• Flexibility	**Very Good:** Used with at risk students Graduate courses delivered Electronic field trips. Requires special training & equipment.	**Excellent:** Access to K-grad. level courses. Special programs, events, seminars broadcast. User friendly, familiar medium.	
Costs			
• Research & Development	none (sunk)	none	
		Via Cable	Via Satellite
• Investment	none (sunk)	$2,100	$6,100
• Operation Per Year (2 courses & 5 students in each course)	$2,538	$4,061	$4,061
• Operation (five years (2 courses per year 5 students in each course)	$12,690	$20,307	$20,307
•Total Dollar Costs (5 yrs)	$12,690	$22,407	$2 6,407
Unit Costs			
• Cost Per Course Per Year (2 courses 5 students each)	$1,269	*$2,241	*$2,641
Cost Per Student	$254	*$448	*$528

* Includes investment costs

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than cable delivery. This figure hold true for total dollar costs, costs per course, and cost per student. Put another way at this level of service, it would cost about $400 dollars more per course (per year) or $80 more per student to derive the increased access to courses possible by satellite delivery. This fact deserves consideration on the part of a decision maker.

VII. Discussion of Findings

Data displayed in Table 6 are based on several critical assumptions which may determine the effectiveness, feasibility, and costs of each alternative. These assumptions must be examined to determine their effect on the outcomes of each alternative.

Assumptions Regarding Effectiveness.

Assumptions affecting course offerings do not include the possibility that the Telelearning Project will be rejuvenated and the number of audiographics courses offered to four or more. Such a change could enhance the effectiveness of audiographics as a delivery system.

Another assumption is that because 22 courses are offered via TI-IN satellite delivery students will have access to 22 courses. Because TI-IN courses are carried on two channels students may have to choose between offerings. For example, this year a student would have to choose between physics or Latin both of which start at 8:00. For some students, access to certain courses may depend on the chance pairing of TI-IN courses. Thus, to say that a student would have a choice of 22 courses is not completely accurate.

I would recommend that a sample of students who are taking advanced courses this year be asked to select the courses they would have liked to take from TI-IN's 1991-92 offerings if they had had the chance and that guidance examine their schedules to determine which courses they could actually schedule. This might give a better indication of genuine access and what might be done to increase access.

Another assumption made about effectiveness is that student satisfaction will remain moderately high for audiographics and TI-IN Network. The quality of audiographics is currently high due to the two experienced, highly qualified instructors. If the audiographic instructors change, student satisfaction could sharply decrease. However, the TI-IN instructors are heavily screened as they are drawn from a nation-wide pool of teachers. In theory, at least, TI-IN teachers are likely to be consistently well-qualified.

Another assumption being made about student satisfaction is that OVCS students

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and students from other parts of the country will respond similarly to instructional television. This may, in fact, not be true. Having been exposed to small classes at OVCS might make it harder for students to accept the decrease in student teacher interaction almost certainly to be encountered.
A better indication of student satisfaction might be to videotape a TI-IN class and have this year's junior students rate them.

Finally, even though the course quality of TI-IN courses has not been determined, an assumption is being made that probably TI-IN courses are or will be approved for by the State of New York for high school credit. If TI-IN course were not likely to be approved, it is not likely that this alternative would be considered further.

Assumptions Regarding Feasibility. The most important assumptions regarding feasibility relate to both staffing requirements and teacher receptivity. Table 6 indicates that facilitators of TI-IN courses will require a minimal increase in staffing requirements and that teacher receptivity to TI-IN courses will be low.

This study assumes that teachers will accept a facilitator assignment as a supervisory assignment. If teachers insist that facilitator assignments be treated as teaching assignment, substantial increases in costs could result for districts which had been planning to use aides as facilitators or teachers assigned to supervisory duties.

Assumptions Regarding Costs. One of the fundamental assumption on which the cost analysis for the TI-IN alternative is based on the assumption that students will pay tuition costs. As previously indicated by Tables 3 and 4, costs of TI-IN are prohibitive if the district is required to pay for tuition. To assume that students will be willing and able to pay tuition costs may be too great an assumption to make, especially given the current recession. Thus, parents of students likely to take advanced courses would have to be surveyed to determine their willingness and ability to pay the required tuition.

Another assumption affecting the relative costs of the two alternatives is that the district will continue to receive a 74% refund of audiographic fees paid to BOCES. It is also assumed that any fees paid by the district for TI-IN courses would not be refunded. If the percentage of fees refunded for audiographics courses were to change, or if fees paid for TI-IN courses were to be refunded, the cost advantage of audiographics may disappear.

Table 7 below shows the costs of audiographics with and without state aid being applied and compares these costs to corresponding cost of TI-IN courses delivered via cable and satellite.

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Table 7: The Effect of State Aid on Audiographics Courses[a]

	Audiographics		TI-IN[b]	
	With Aid	No Aid	Cable	Satellite
R&D	NA	NA	NA	NA
Investment	NA	NA	$ 2,100	$ 6,100
Operations Per Year	$ 2,538	$ 8,703	$ 4,061	$ 4,061
Operations Five Years	$12,690	$43,515	$20,307	$20,307
Total Costs[c]	$12,690	$43,515	$22,407	$26,407

[a] At two courses, five students each
[b] Student pays tuition
[c] Includes investment costs

According to Table 7, the costs of audiographics unaided becomes about twice the costs of TI-IN cable or satellite courses. Table 8 below illustrates the effect of applying a 74% aid ratio to TI-IN courses both when the student pays tuition and when the district pays tuition.

As shown in Table 8, by applying the state aid to TI-IN courses (see Appendix C), delivery of TI-IN courses via satellite with students paying tuition attains a cost advantage over audiographics course delivery. Operations per year and for five years decrease to 50% of those costs for audiographics while the total dollar costs become equivalent. Moreover, satellite delivery of TI-IN courses with the district paying tuition becomes much more competitive.

Table 8: The Effect of State Aid on TI-IN Course Delivery Via Satellite[a]

	Audiographics	TI-IN	Aided
	Aided	SP[b]	DP[c]
R & D	NA	NA	NA
Investment	NA	$6,100	$6,100
Operations Per Year	$2,538	$1,185	$2,978
Operations Five Years	$12,690	$5,925	$14,890
Total Costs[d]	$12,690	$12,025	$20,990

[a] At two courses, five students each
[b] Student pays tuition.
[c] District pays tuition.
[d] Includes investment costs.

Thus, the amount of state aid, and whether it can be applied to an alternative are important considerations which can significantly alter costs. Decision makers must be acutely aware of this fact as conditions change in the future.

VIII. Summary and Conclusion

This study has identified and displayed many of the costs and effects of two alternative ways of providing advanced courses for OVCS students: audiographics and TI-IN Network. It was found that given the specific assumptions contained in the study, the constraints existing in the OVCS setting (including the perceived

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values of the decision makers), that while audiographics has an apparent cost advantage over the delivery of courses via TI-IN, TI-IN has certain advantages in effectiveness over audiographics.

It is the role of the decision maker to weigh the costs and effects of audiographics course delivery against the costs and effects of TI-IN course delivery to determine which alternative is more cost effective. Among the questions decision makers face as a result of this study are "Do the specific effects of TI-IN merit the increased costs?" and "Do the lower costs of audiograhics compensate for the limited course offerings?" Hopefully, the data contained in this study will be as useful in helping to answer these questions as they have been in helping to raise them.

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Appendix A: The Cost of Audiographics

This appendix contains the calculations used to determine the costs to the Otselic Valley Central School District of audiographics courses at various levels of service. Each table is labeled according to the type of cost data it contains. More information is available from the author upon request.

One Audiographics Course: Cost to the District

Year	BOCES Fees [1]	Refund Due [2]	Refund Schedule 25% Nov.[3]	Refund Schedule 75% June[4]	Refund Value 25% Nov.[5]	Refund Value 75% June[6]	Cost To District
92-93	5250	3885	971	2914	951	2768	1531
93-94	5513	4079	1020	3059	998	2906	1608
94-95	5788	4283	1071	3212	1048	3052	1688
95-96	6078	4497	1124	3373	1101	3204	1772
96-97	6381	4722	1181	3542	1156	3365	1861

Operation 5 Years:	$8460
Operation Per Year:	$1692
Operation Per Course:	$1692
Operation Per Student:	$338

[1] **BOCES Fees:** Estimated annual subscription and course fees paid to BOCES for two courses inflated at 5%. (1991-92 Subscription fees = $2,500, 1991-92 course fees = $2,500 each)

[2] **Refund Due:** Total amount BOCES must return to the district based the State aid formula (74%).

[3/4] **Dollars Refunded:** Refers to the refund schedule in which 25% of the district's BOCES fees are refunded in November of the following year and 75% refunded the following June.

[5/6] **Refund Value:** Reflects the real value to the district of each refund (minus 5% per year lost opportunity).

Two Audiographics Courses: Cost to the District

Year	BOCES Fees [1]	Refund Due [2]	Refund Schedule 25% Nov.[3]	Refund Schedule 75% June[4]	Refund Value 25% Nov.[5]	Refund Value 75% June[6]	Cost To District
92-93	7875	5828	1457	4371	1426	4152	2297
93-94	8269	6119	1530	4589	1498	4360	2411
94-95	8682	6425	1606	4819	1572	4578	2532
95-96	9116	6746	1687	5060	1651	4807	2659
96-97	9572	7083	1771	5313	1734	5047	2792

		Aided	Unaided
Operation	5 Years:	$12690	$43514
Operation	Per Year:	$2538	$8702
Operation	Per Course:	$1269	$4351
Operation	Per Student:	$254	$ 870

[1] **BOCES Fees:** Estimated annual subscription and course fees paid to BOCES for two courses inflated at 5%. (1991-92 Subscription fees = $2,500, 1991-92 course fees = $2,500 each)

[2] **Refund Due:** Total amount BOCES must return to the district based the State aid formula (74%).

[3/4] **Dollars Refunded:** Refers to the refund schedule in which 25% of the district's BOCES fees are refunded in November of the following year and 75% refunded the following June.

[5/6] **Refund Value:** Reflects the real value to the district of each refund (minus 5% per year lost opportunity).

Three Audiographics Courses: Cost to the District

Year	BOCES Fees [1]	Refund Due [2]	Refund Schedule 25% Nov.[3]	Refund Schedule 75% June[4]	Refund Value 25% Nov.[5]	Refund Value 75% June[6]	Cost To District
92-93	10500	7770	1943	5828	1902	5536	3062
93-94	11025	8159	2040	6119	1997	5813	3215
94-95	11576	8566	2142	6425	2097	6104	3376
95-96	12155	8995	2249	6746	2201	6409	3545
96-97	12763	9444	2361	7083	2312	6729	3722

Operation	**5 Years:**	$16920
Operation	**Per Year:**	$3384
Operation	**Per Course:**	$1128
Operation	**Per Student:**	$226

1 **BOCES Fees:** Estimated annual subscription and course fees paid to BOCES for two courses inflated at 5%. (1991-92 Subscription fees = $2,500, 1991-92 course fees = $2,500 each)

2 **Refund Due:** Total amount BOCES must return to the district based the State aid formula (74%).

3/4 **Dollars Refunded:** Refers to the refund schedule in which 25% of the district's BOCES fees are refunded in November of the following year and 75% refunded the following June.

5/6 **Refund Value:** Reflects the real value to the district of each refund (minus 5% per year lost opportunity).

Four Audiographics Courses: Cost to the District

Year	BOCES Fees [1]	Refund Due [2]	Refund Schedule 25% Nov.[3]	Refund Schedule 75% June[4]	Refund Value 25% Nov.[5]	Refund Value 75% June[6]	Cost To District
92-93	12500	9250	2313	6938	2264	6591	3645
93-94	13125	9713	2428	7284	2377	6920	3828
94-95	13781	10198	2550	7649	2496	7266	4019
95-96	14470	10708	2677	8031	2621	7629	4220
96-97	15194	11243	2811	8433	2752	8011	4431

Operation	**5 Years:**	$20143
Operation	**Per Year:**	$4029
Operation	**Per Course:**	$1007
Operation	**Per Student:**	$201

1 BOCES Fees: Estimated annual subscription and course fees paid to BOCES for two courses inflated at 5%. (1991-92 Subscription fees = $2,500, 1991-92 course fees = $2,500 each)

2 Refund Due: Total amount BOCES must return to the district based the State aid formula (74%).

3/4 Dollars Refunded: Refers to the refund schedule in which 25% of the district's BOCES fees are refunded in November of the following year and 75% refunded the following June.

5/6 Refund Value: Reflects the real value to the district of each refund (minus 5% per year lost opportunity).

Appendix B: The Cost TI-IN Network

This appendix contains the calculations used to determine the costs to the Otselic Valley Central School District of TI-IN courses at various levels of service. Each table is labeled according to the type of cost data it contains. More information is available from the author upon request.

Cost of One TI-IN Course Via Cable

(five students per course)

Phase	Subscription	Hardware	Tuition	Totals
R&D	NA	NA	NA	NA
Investment	NA	$2100	NA	$2100
Operation				
92-93	$3675		$2783	$6458
93-94	$3859		$2922	$6780
94-95	$4052		$3068	$7119
95-96	$4254		$3221	$7475
96-97	$4467		$3382	$7849
Totals	**$20307**	**$2100**	**$15375**	**$37782**

	Students Pay Tuition		District Pays	
Operation	5 Years	$20307	5 Years	$35682
Operation	Per Year	$4061	Per Year	$7136
Invest.&Op.	Per Course	$4481	Per Course	$7556
Invest.&Op.	Per Student	$896	Per Student	$1511

Subscription fee: $3,500 (1991-92 rates inflated at 5%)

Hardware: $1,200 SID Device, $900 estimated cost of TV, VCR, and stand.

Tuition: $ 530 per student (1991-92 rates inflated at 5%)

Cost of Two TI-IN Courses Via Cable

(five students per course)

Phase	Subscription	Hardware	Tuition	Totals
R&D	NA	NA	NA	NA
Investment	NA	$2100	NA	$2100
Operation				
92-93	$3675		$5565	$9240
93-94	$3859		$5843	$9702
94-95	$4052		$6135	$10187
95-96	$4254		$6442	$10696
96-97	$4467		$6764	$11231
Totals	**$20307**	**$2100**	**$30750**	**$53157**

	Students Pay Tuition		District Pays	
Operation	5 Years	$20307	5 Years	$51057
Operation	Per Year	$4061	Per Year	$10211
Invest.&Op.	Per Course	$2241	Per Course	$5316
Invest.&Op.	Per Student	$448	Per Student	$1063

Subscription fee: $3,500 (1991-92 rates inflated at 5%)

Hardware: $1,200 SID Device, $900 estimated cost of TV, VCR, and stand.

Tuition: $ 530 per student (1991-92 rates inflated at 5%)

Cost of Three TI-IN Courses Via Cable

(five students per course)

Phase	Subscription	Hardware	Tuition	Totals
R&D	NA	NA	NA	NA
Investment	NA	$2100	NA	$2100
Operation				
92-93	$3675		$8348	$12023
93-94	$3859		$8765	$12624
94-95	$4052		$9203	$13255
95-96	$4254		$9663	$13918
96-97	$4467		$10146	$14613
Totals	**$20307**	**$2100**	**$46125**	**$68532**

	Students Pay Tuition		District Pays	
Operation	5 Years	$20307	5 Years	$66432
Operation	Per Year	$4061	Per Year	$13286
Invest.&Op.	Per Course	$1494	Per Course	$4569
Invest.&Op.	Per Student	$299	Per Student	$914

Subscription fee: $3,500 (1991-92 rates inflated at 5%)

Hardware: $1,200 SID Device, $900 estimated cost of TV, VCR, and stand.

Tuition: $ 530 per student (1991-92 rates inflated at 5%)

Cost of Four TI-IN Courses Via Cable

(five students per course)

Phase	Subscription	Hardware	Tuition	Totals
R&D	NA	NA	NA	NA
Investment	NA	$2100	NA	$2100
Operation				
92-93	$3675		$11130	$14805
93-94	$3858		$11686	$15545
94-95	$4051		$12270	$16322
95-96	$4254		$12884	$17138
96-97	$4466		$13528	$17995
Totals	**$20306**	**$2100**	**$61500**	**$83906**

Students	PAY TUITION		District	Pays
Operation	5 Years	20306	5 Years	81806
Operation	Per Year	4061	Per Year	16361
Invest.&Op.	Per Course	1120	Per Course	4195
Invest.&Op.	Per Student	224	Per Student	839

Subscription fee: $3,500 (1991-92 rates inflated at 5%)

Hardware: $1,200 SID Device, $900 estimated cost of TV, VCR, and stand.

Tuition: $ 530 per student (1991-92 rates inflated at 5%)

Cost of One TI-IN Course Via Satellite

(five students per course)

Phase	Subscription	Hardware	Tuition	Totals
R&D	NA	NA	NA	NA
Investment	NA	$6100	NA	$6100
Operation				
92-93	$3675		$2782	$6457
93-94	$3858		$2921	$6780
94-95	$4051		$3067	$7119
95-96	$4254		$3221	$7475
96-97	$4466		$3382	$7849
Totals	**$20306**	**$6100**	**$15375**	**$41781**

Students Pay Tuition			District Pays	
Operation	5 Years	$20307	5 Years	$35681
Operation	Per Year	$4061	Per Year	$7136
Invest.&Op.	Per Course	$5281	Per Course	$8356
Invest.&Op.	Per Student	$1056	Per Student	$1671

Subscription fee: $3,500 (1991-92 rates inflated at 5%)

Hardware: $6,100 ($4000 satellite dish, $1,200 SID Device, $900 estimated cost of TV, VCR, and stand.)

Tuition: $ 530 per student (1991-92 rates inflated at 5%)

Cost of Two TI-IN Courses Via Satellite

(five students per course)

Phase	Subscription	Hardware	Tuition	Totals
R&D	NA	NA	NA	NA
Investment	NA	$6100	NA	$6100
Operation				
92-93	$3675		$5565	$9240
93-94	$3858		$5843	$9702
94-95	$4051		$6135	$10187
95-96	$4254		$6442	$10696
96-97	$4466		$6764	$11231
Totals	**$20306**	**$6100**	**$30750**	**$57156**

Students Pay Tuition			District Pays	
Operation	5 Years	$20307	5 Years	$51057
Operation	Per Year	$4061	Per Year	$10211
Invest.&Op.	Per Course	$2640	Per Course	$5715
Invest.&Op.	Per Student	$528	Per Student	$1143

Subscription fee: $3,500 (1991-92 rates inflated at 5%)

Hardware: $6,100 ($4000 satellite dish, $1,200 SID Device, $900 estimated cost of TV, VCR, and stand.)

Tuition: $ 530 per student (1991-92 rates inflated at 5%)

Cost of Three TI-IN Courses Via Satellite

(five students per course)

Phase	Subscription	Hardware	Tuition	Totals
R&D	NA	NA	NA	NA
Investment	NA	$6100	NA	$6100
Operation				
92-93	$3675		$8347.	$12022
93-94	$3858		$8764	$12623
94-95	$4051		$9203	$13254
95-96	$4254		$9663	$13917
96-97	$4466		$10146	$14613
Totals	**$20306**	**$6100**	**$46125**	**$72531**

Students	Pay Tuition		District	Pays
Operation	5 Years	$20307	5 Years	$66431
Operation	Per Year	$4061	Per Year	$13286
Invest.&Op.	Per Course	$1760	Per Course	$4835
Invest.&Op.	Per Student	$352	Per Student	$967

Subscription fee: $3,500 (1991-92 rates inflated at 5%)

Hardware: $6,100 ($4000 satellite dish, $1,200 SID Device, $900 estimated cost of TV, VCR, and stand.)

Tuition: $ 530 per student (1991-92 rates inflated at 5%)

Cost of Four TI-IN Courses Via Satellite

(five students per course)

Phase	Subscription	Hardware	Tuition	Totals
R&D	NA	NA	NA	NA
Investment	NA	$6100	NA	$6100
Operation				
92-93	$3675		$11130	$14805
93-94	$3858		$11686.	$15545
94-95	$4051.		$12270	$16322
95-96	$4254		$12884	$17138
96-97	$4466		$13528	$17995
Totals	**$20306**	**$6100**	**$61500**	**$87906**

Students	Pay Tuition		District	Pays
Operation	5 Years	$20306	5 Years	$81806
Operation	Per Year	$4061	Per Year	$16361
Invest.&Op.	Per Course	$1320	Per Course	$4395
Invest.&Op.	Per Student	$264	Per Student	$879

Subscription fee: $3,500 (1991-92 rates inflated at 5%)

Hardware: $6,100 ($4000 satellite dish, $1,200 SID Device, $900 estimated cost of TV, VCR, and stand.)

Tuition: $ 530 per student (1991-92 rates inflated at 5%)

Cost of Four TI-IN Courses Via Satellite

(five students per course)

Phase	Subscription	Hardware	Tuition	Totals
R&D	NA	NA	NA	NA
Investment	NA	$6100	NA	$6100
Operation				
92-93	$3675		$11130	$14805
93-94	$3858		$11686.	$15545
94-95	$4051.		$12270	$16322
95-96	$4254		$12884	$17138
96-97	$4466		$13528	$17995
Totals	**$20306**	**$6100**	**$61500**	**$87906**

Students	Pay Tuition		District	Pays
Operation	5 Years	$20306	5 Years	$81806
Operation	Per Year	$4061	Per Year	$16361
Invest.&Op.	Per Course	$1320	Per Course	$4395
Invest.&Op.	Per Student	$264	Per Student	$879

Subscription fee: $3,500 (1991-92 rates inflated at 5%)

Hardware: $6,100 ($4000 satellite dish, $1,200 SID Device, $900 estimated cost of TV, VCR, and stand.)

Tuition: $ 530 per student (1991-92 rates inflated at 5%)